

**Observations on Denham's Bustard *Neotis denhami* at Maralal, Kenya**  
Jackson's Bustard, the East African race of Denham's Bustard *Neotis denhami*, now occurs only very locally in Kenya. One of its population centres in Kenya is the high country on the eastern edge of the Rift Valley near Maralal. As a result of the illegal export of bustards from East Africa to Arab nations desiring them as targets in falconry, interest in local populations has increased. The objectives of this short study were to determine the number of Jackson's Bustards in the Maralal population and gather notes on their display.

### Study area

The study was conducted 3 km south of Poror, located 20 km north of Maralal, in north-central Kenya. Observations were made in an area of low rolling hills about 4 km east to west and 6 km north to south, at an elevation of approximately 2500 m. The western border of the study area is the Rift Valley escarpment, and a road leads east to west across the north end of the study area to the spectacular Rift Valley view-point known as Losiolo. The lands are owned by the Samburu tribe who graze cattle, sheep and goats over the entire area. A farmer has leased much of these lands from the tribe and about 50 per cent of the area, the relatively flat part, has been ploughed and planted with wheat. During the study (late April and early May) these fields were ploughed or harvested and bare, but sowing, I was told, was to occur soon. Many fields had been burned, others had been ploughed this year for the first time. Rocky soils and steeper slopes in the study area remain unploughed and are vegetated by wild grasses and low scrub. Narrow, forested ravines cut through the area.

### Methods

The study, conducted on 26 and 27 March, and 6 and 7 April 1986, amounted to 25.5 observation hours and included three dawns and three dusks. Observations were made with 7 x 35 binoculars and a 20 x 60 spotting 'scope, generally from over 200 m away. Most observation effort was concentrated in the northeast corner of the area within view of the wheat farm headquarters. Nearly 60 per cent of this time was spent observing the easternmost male (male E) and any other bustards that were visible from my vantage point near him.

### Results and discussion

#### *Population*

During an earlier visit to the area on 5 March 1986 (at 17:00), eleven Jackson's Bustards were counted in the study area. They included a group of six birds, two pairs and a single. None was displaying. This concentration of eleven birds in a small area suggested that the bustards were still in non-breeding flocks at this time. During the study reported here the maximum number noted at one time was seven, with these scattered in groups of five or less. The impression was that over 15 birds used the study area; four displaying males were found. Individuals could be differentiated by carefully noting the pattern of black and white on the wings (Fig. 1). This could be done accurately only when a bird was observed from about 150 m or closer and for long periods. Five individuals were identified in this way, including three of the displaying males. Their distinctive wing patterns probably enable Jackson's Bustards to recognize individuals, and this would seem advantageous to members of a long-lived species with delayed

maturity and a dominance system related to longevity. Without such recognition more energy would be expended in dominance re-establishment each breeding season.

### *Displaying males*

Males exhibited two different displays. A 'balloon display', as it is generally referred to in bustards, was common and appears to function in attracting females and also probably in advertising territory and dominance to other males. The second display type observed I call the 'boundary display.' It was seen only twice, both times between the same two males.

The balloon display was performed each morning and evening by some (and probably all) of the four displaying males. Upon my arrival at first light (at 06:21, 06:22 and 06:51) on the three mornings, male E was already 'in balloon.' Morning display frequency declined gradually after about 08:00 and ended for male E at 08:38, 09:04 and 09:14 respectively on the three mornings. In the afternoons, males were discovered already in display on five occasions, all between 16:45 and 17:45. Male E was still displaying when I left the area at 18:30, 18:32 and 19:12 on the three evenings in question. Outside the morning and evening display periods, males would usually disperse by flying or walking out of their display territories.

The balloon display was performed even when there appeared to be no other bustards within view of the male, which was most of the time. Male E had one primary display area where he spent nearly half of the morning and evening periods. His primary display area was an unploughed grassy 'island', 150 m x 150 m, surrounded by ploughed fields and a road and situated on a slight east-facing slope so that, when displaying, he was easily visible to the northeast, east and south. From his primary area male E strutted in balloon display up to 1000 m to the east, 400 m to the west and 300 m to the south, but did not wander north. Within this territory, displays were also concentrated in unploughed patches at the east end and in the southwest, but some displaying occurred throughout the territory, including ploughed areas.

Movement between the three areas of concentrated display was usually rapid, with the bird in 'balloon.' The distance from the primary area of male E to that of the next nearest male was some 1700 m. The balloon display varied greatly in intensity and often lasted for hours with only short pauses. About 90 per cent of male E's morning and evening periods were occupied by the balloon display, with the greatest activity very early and very late in the day. Between display bouts the male would relax his feathers and stand, walk or forage. A male in the balloon display has his white foreneck, chest and belly feathers erected and his orange nape fanned wide into an oblong. The head is tilted slightly upward and the wings are drooped (Fig. 1). In this posture males walk slowly or quickly, occasionally forage for short periods, or stand still, sometimes for five minutes or more. This typical display is interrupted by bouts of more intense 'display struts', which generally last 10 to 20 minutes and occupy about 30 per cent of the daily display period. These display struts often occur when no other birds are in view, but are disproportionately frequent and more rapid when other birds are present. A display strut begins with the male ballooning more fully, the neck, chest and upper belly feathers lifted even higher than in the typical 'balloon.' The male then struts straight forward for about 15 to 30 m. The average



Fig. 1. *Jackson's Bustard* in balloon display

white  
balloon

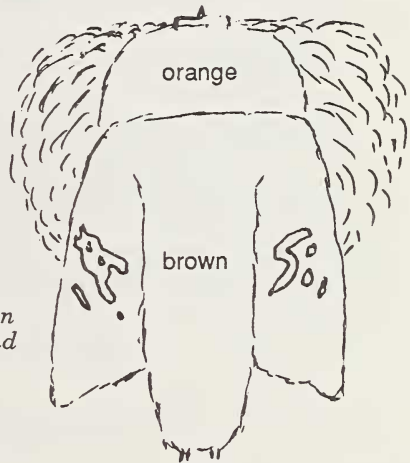


Fig. 2. *Male Jackson's Bustard* in vertical display, seen from behind

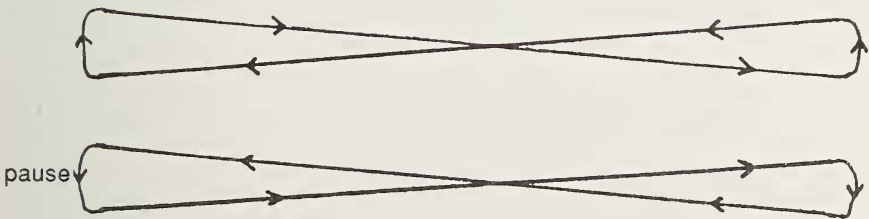


Fig. 3. Configuration of the boundary display. Arrows represent the direction walked by the displaying males

duration of 20 timed struts was 28 s, with the longest 63 s, the shortest 11 s.

Usually, at the end of a strut, the male begins a 'vertical display', so that the body is nearly vertical (Fig. 2). In this posture the white balloon and orange nape lift higher, so as to nearly conceal the head. It appears that the flared oblong of nape orange is aimed at the object of the display. After 7 to 8 s the upper body shudders and there is a quick, slight bloating of the throat and opening of the mouth, suggesting that some call has been made. Due to the wind I was never able to hear this vocalization, which others report is made by Denham's Bustard. After the shudder the male remains erect for about 14 to 17 s, and sometimes rotates slowly around, displaying in other directions. Twenty timed vertical displays averaged 21 s with the longest 40 s and the shortest 9 s.

On coming down from a vertical display, males usually immediately begin another display strut, typically in the same direction, but often turning so as to remain in one of the relatively small display areas. Each day, single birds and groups of up to five (males and females) flew and walked into male E's display territory where they foraged, often for an hour or more. In most cases these birds treated male E with indifference, but their frequent appearance suggests that they came to interact. These visiting groups varied in size and individual composition. There was little overt interaction between members of these groups, although on one occasion a male approached a female directly and she lowered her outstretched head to the ground, opened her wings for 2 s and then walked quickly away. The male did not follow. The groups usually flew or walked from male E's territory before 09:00.

Flying bustards seemed to elicit flight in other bustards, even birds over a kilometre away. The black and white wing pattern is striking in flight. When bustards were in his territory, male E usually increased the frequency of his display struts and directed more displays in the direction of the visitors. In most cases there was no difference in the way he behaved towards non-breeding males (which have less intense nape orange) and females. On one occasion male E was observed courting a group for 28 min until dusk. As he approached the female his struts became shorter (8 to 14 s, and about 10 m) and the vertical display after the shudder was held longer (up to 30 s). His struts were towards or sideways to her and during each vertical display he turned to face the flared rufous nape at the female. The female appeared interested and walked towards the male, but also continued to forage.

The boundary display was observed only twice, both times at the same location between male E and his neighbour to the west. The location of the display was the most westerly point that male E was observed and probably represented the extreme of his territory. The two males paced parallel to each other, mostly about 2 to 5 m apart, with their orange napes lifted but not flared horizontally as in the balloon display. The 'balloon' was not distended. The mouth was held slightly open part of the time. After pacing thus for 5-25 m, they faced away from each other slowly, pausing for a few seconds with the napes directed towards each other, then slowly turned back and again paced parallel in the opposite direction (Fig. 3). Each pace-and-turn varied in duration, but the average time was about one minute. The two boundary displays lasted 18 and 6 min, the second ending when a Tawny Eagle *Aquila rapax* chased the two birds apart.



### Habitat, foraging and other activities

Jackson's Bustards spent most time in ploughed fields and less in grasslands and areas of low bush. This use pattern corresponds with the relative availability of habitats in the study area. Birds were not seen in the forested ravines. Foraging was noted at all times of day. Most mornings and evening were spent watching displaying males, which fed little. Females and non-breeding males may feed more during morning and evening, but this was not determined. Food items were small and, due to the distance of observation, none was positively identified. In most cases of foraging, a bird would walk along slowly, picking at the ground about every 10 s. Occasionally several ground-picking motions would be made rapidly in succession. In the barren and sometimes burned ploughed fields, wheat chaff and occasional seeds were available. The slow and rapid picking motions of birds in such fields suggest that they were eating this wheat. In grasslands, birds picked at the heads of grasses and herbs on a few occasions. Once a bird picked juniper berries, working its way round a small tree. Drinking was never noted. A small reservoir near the centre of the study area was the only known permanent water.

During the middle of the day, from 11:00 to 16:00, few bustards were noted, suggesting that they may sit or enter bush and ravines at this time. One bird was watched sitting for 44 min and was still sitting in a 30 to 40-km/h wind when I left—the brown back and wing coverts blending perfectly with the bare sod.

### Predators and disturbances

Samburu herders with livestock and pedestrians travelling to and from the settlement of Poror constantly moved across the study area. Bustards flew or walked to the side of these people and in no instance did I see people pay any attention to them. Tawny Eagles twice flushed bustards but adults are probably too large for this eagle to prey on. Troops of baboons *Papio* sp. frequently crossed the area and these could be a threat to eggs and chicks. Golden Jackals *Canis aureus* were seen three times in the area, including one that came within 30 m of a displaying bustard causing the bird to stop his display. A Steinbok *Raphicerus campestris* was seen foraging within 3 m of a bustard with both animals paying no apparent attention to each other.

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